

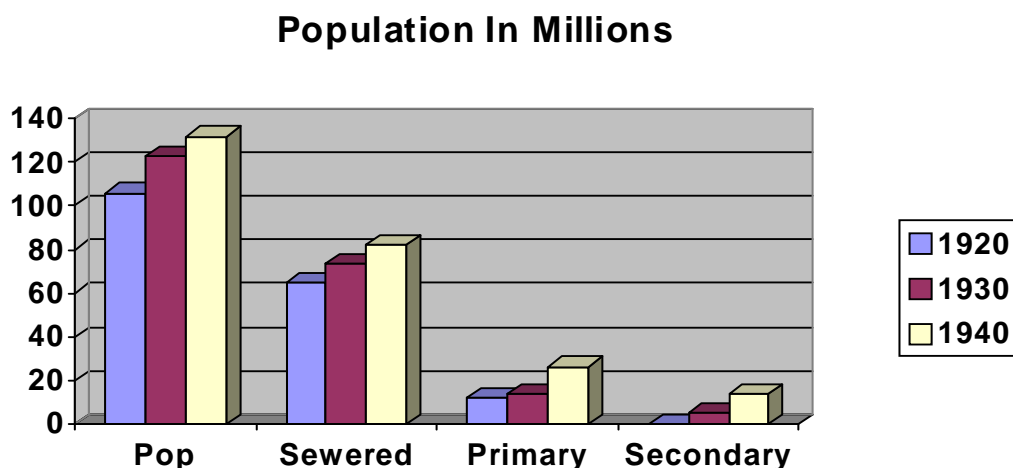
Coeur d'Alene, Idaho's Wastewater Treatment Plant History

H. Sid Fredrickson
Wastewater Superintendent

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Although there were secondary treatment plants; both trickling filters and activated sludge, as early as 1901, centralized treatment didn't really take off until the 1920s. Primary treatment was the norm well into the 1940s and 50s. Primary treatment typically involves sedimentation by gravity in tanks called clarifiers. This form of treatment does nothing to remove the finely suspended (colloidal) solids or the dissolved solids. Secondary treatment utilizes biological growth – mainly bacteria – to convert these remaining organics into their own biomass, which is more easily removed from the liquid stream. Secondary treatment typically uses a fixed media, like plastic, or suspended growth media. In the fixed film the biomass grows on a media such as rocks or plastic. Suspended growth media is also called activated sludge where the biomass is suspended in aerated liquid media.

The following chart indicates the population of the U.S. and the approximate numbers served by sewers for the period of 1920 to 1940. (Source: US Census & Water Environment Federation MOP 8)



The Coeur d'Alene wastewater treatment plant was first commissioned in 1939. It was initially a secondary plant. The primary portion consisted of headworks with screening and disinfection with chlorine; and a flocculator followed by a single primary clarifier. The secondary portion consisted of a rock-media trickling filter followed by a secondary clarifier. The final effluent was not initially chlorinated for disinfection before being discharged to the Spokane River through an open pipe that ended about 200 feet from shore. There was separate grit removal in the flocculator. There was a natural/digester gas fired incinerator to dispose of the screenings. Primary and secondary sludge was co-thickened in a gravity thickener. Thickened sludge was sent to two digesters; a primary and a secondary one. Digested sludge

then went to sludge drying beds. Final disposal was by making the product available to the citizens and land application on city property.

Research into news articles in the Coeur d'Alene Press has revealed the follow chronology of events:

June 21, 1938 – The federal Public Works Administration tells the city that they will not approve funding for the East End sewer unless the city commits to a “sewage disposal plant.”

August 4, 1938 – Council votes unanimously to award a contract to L. R. Stockman of Baker, Oregon for the following services: “Field inspection of the site, consultation with the Idaho State Sanitary Engineer, office studies, estimate (breakdown) of cost, preliminary plans, furnishing six counterparts of the report, estimate of cost and preliminary plans and assisting the City in preparation of the application to the Public Works Administration for funds to aid in the financing of the cost of the project.”

August 9, 1938 – Highland Park Grange urges the city to build a plant; providing relief for 40 to 50 families along the river.

September 6, 1938 – Letter published from mayor explaining the need for a treatment plant (or a sewage disposal plant as it was referred to in those days.

September 9, 1938 – Post Falls petitions city to build a plant.

September 10, 1938 – The state chemist urges the city to build a plant.

September 28, 1938 – Bond to build plant passes 688 to 180 to raise \$77,000 for the city's 55% share. Total estimated cost is \$140,000.

October 17, 1938 – Council unanimously passes a resolution accepting a grant for 45% and not to exceed \$63,225.00 to aid in the construction of the plant. This translates to a total plant cost in the range of \$140,500. Plant is to built for a population of 15,000.

December 5, 1938 – Bid awarded to B. H. Sheldon of Spokane for a total of \$115,552.

April 8, 1939 – Plant reported nearly done.

June 9, 1939 – Engineer and council inspect and tests plant.

July 19, 1939 – The city waits for final certification of plant.

August 1, 1939 – City receives final plant certification.

October 15, 1939 – Final performance testing of the plant was completed.

October 17, 1939 – James Ingalls was selected as plant operator. (This was Jon Ingalls grandfather.)

April 6, 1940 – City council approves the East End sewer.

The history indicates that our facility was one of the first secondary plants in the Northwest. I believe the decision to build a secondary plant was as much to gather data and test performance of this relatively new technology as it was to clean up the river. From roughly the first of May 1939 through October 1939 is a long time to test and optimize any plant – then or now.

The population of Coeur d’Alene in the 1940 census was right at 10,000. Certainly economic conditions in the city and county would likely to have prompted the federal Public Works Administration to offer the grant to the city. As can be noted in the above graph, of the 82.3 million people that were on sewer in 1940, only 17% were served by secondary treatment. Most of the communities with secondary treatment were greater than 50,000 in size. This certainly makes Coeur d’Alene very unique in the country.

In 1967 certain processes were aging and being overloaded. In November voters were asked to pass a bond for \$550,000. It was rejected, having only received 44% approval of the needed 67%.

In 1971 voters were again asked for approval. This time the project would cost nearly \$2 million, with only \$400,000 needed in bonds. This decision passed with 86.6% approval. Construction was slated to start in 1972.

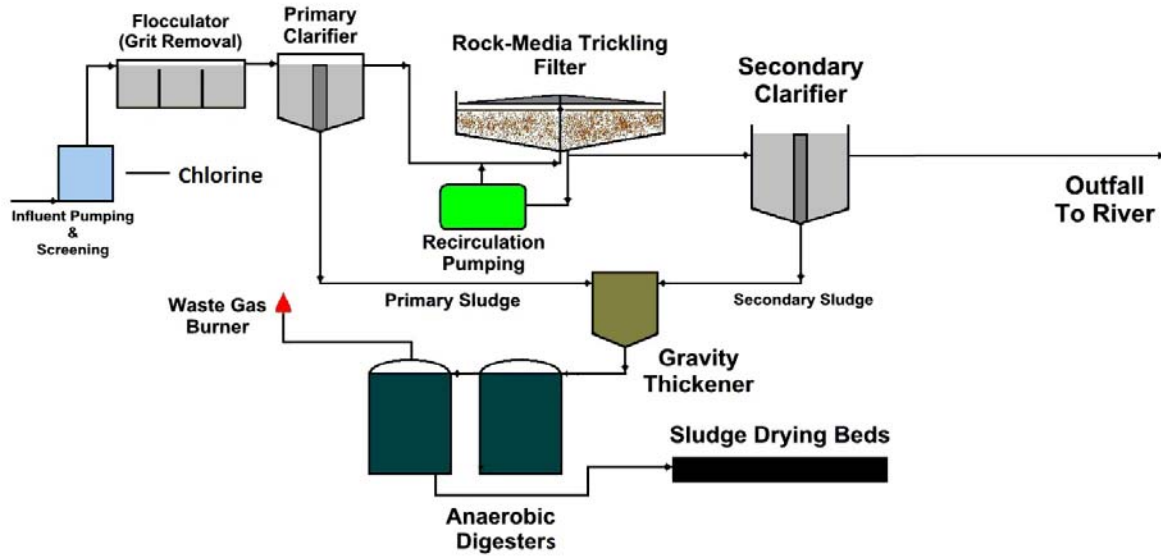
In 1973 effluent disinfection by chlorination was added. It is believed that this was not mandated, but implemented for health protection of river users.

Plant improvements included equipment replacements and upgrading the trickling filter by adding two more spray bars and increasing the capacity of the recirculation pumps, as well as rehab of both clarifiers. A third digester was also added.

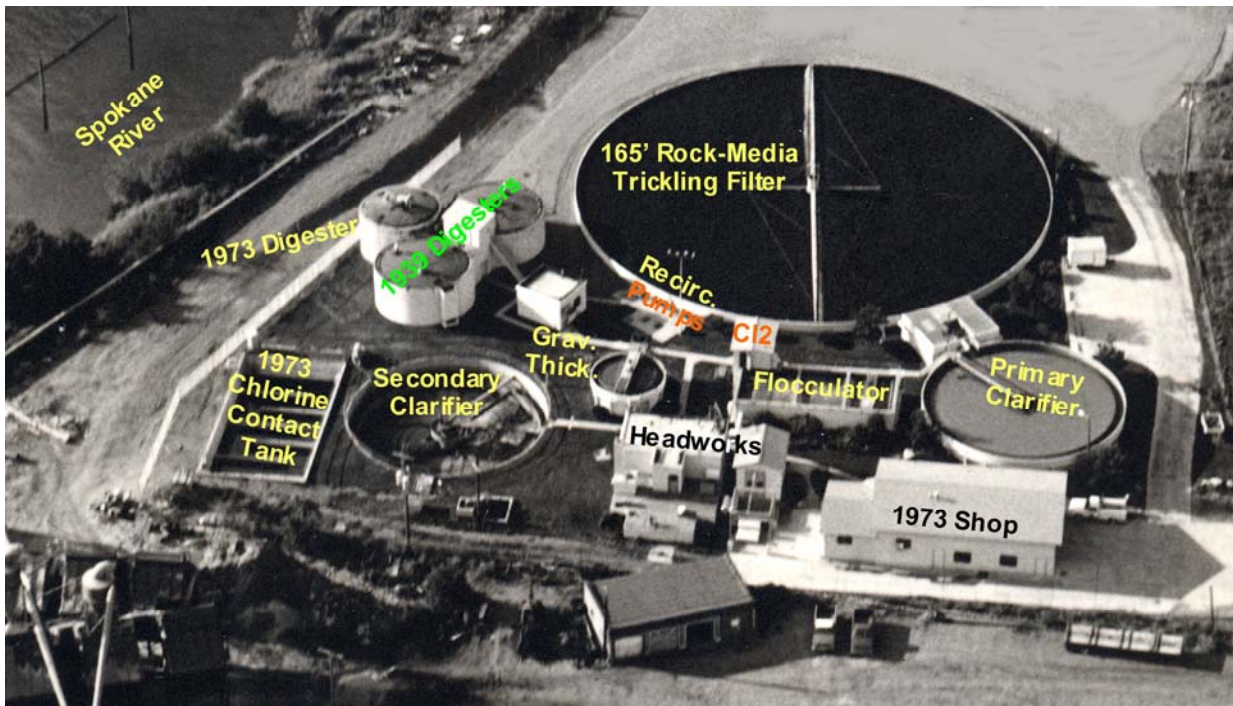
By the late 1970s, the plant was overloaded. This resulted in a moratorium on new hookups to the system. By 1982, a new facility plan had been completed and construction on a new secondary clarifier was underway. This resulted in the lifting of the moratorium and the beginning of a multi-phase program of upgrades and capacity expansions.

Including the completion of the one secondary clarifier, other phases of construction contracts added the following projects as listed in the table:

Project	Year	Cost (\$ Millions)
Phase 1 – Secondary Clarifier	1982-83	\$ 1.0
Phase 2 – Solids Contact, Digester & De-watering	1984-86	\$ 4.4
Phase 2A – Admin. Bldg. & Laboratory	1986-87	\$ 0.3
Phase 3A – Primary Clarifier & Compost Facility	1987-88	\$ 3.4
Phase 3B – Raw Sewage Pumping, Pre-aeration/Grit, Sludge Thickening & De-chlorination	1988-90	\$ 3.4
Compost Improvements	1992-94	\$ 4.0
Phase 3C – Phosphorus Control, Trickling Filters, Digester & De-watering	1991-95	\$ 12.0
Odor Control	1999-00	\$ 1.2
Phase 4A – Improve Disinfection Control, Aeration & Stormwater Control	2001-03	\$ 0.8
Phase 4B – New Headworks, Solids Centrifuge, Electrical Entrance & Clarifier Covers	2005-07	\$ 15.0
Pilot Project For Low Phosphorus	2009-11	\$ 3.8
Phase 5A – IFAS Ammonia Control & Solids	2008-09	\$ 0.6
Phase 5B – Admin./Lab, Digester w/Control Bldg.	2010-11	\$ 16.0
Phase 5C.1 – Partial Tertiary Treatment	2013-14	\$ 12.4
TOTAL		\$ 78.3



Coeur d'Alene's Secondary Wastewater Treatment Plant - 1939



Plant in 1981 showing the 1939 structures & 1973 Additions

In 1990, the city's state-of-the-art biosolids composting facility came on line. It uses a process known as aerated static piles. Biosolids and wood chips are combined to obtain a mixture that is placed in piles where air is either drawn or blown through them. This portion of the process takes 21 days. The mixture is screened with the larger fraction returned to the recycled chip pile. The fine material is placed outside for 30 days of aerated curing. Following that it is ready for the wholesale marketing to local landscapers and nurseries.

Foul air treatment for odor control was added in 1998 to the plant. The system brings foul air from the most odiferous processes to compost-bed biofilters – similar to what is used at the compost facility.

The city completed and adopted a new facility plan in 2010. This plan recommends three sub-phases of projects over the next five to seven years. Total cost for these improvements and expansion is anticipated to be \$51 million.

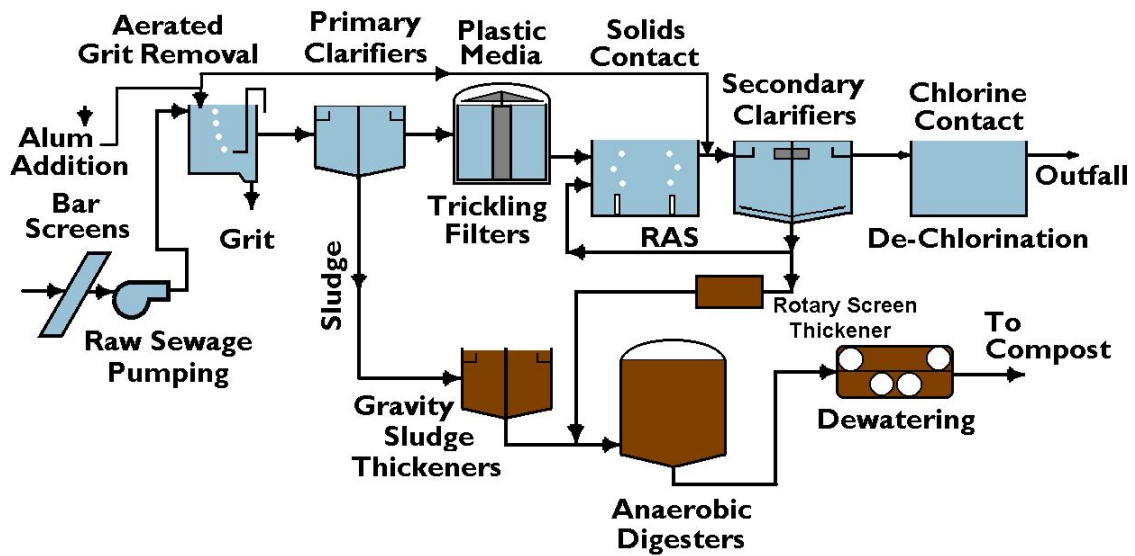


Outfall - 1981

For 2013, current population served was 45,000, of which we estimate 99% are on sewer. Average daily flow is 3.6 MGD. Influent CBOD averages 320 mg/L with the effluent averaging 5 mg/L. Influent TSS averages 300 mg/L with the effluent averaging 7 mg/L. Ammonia from July through the September required removal period stayed below the permitted 10 mg/L value. Required phosphorus removal during the growing season is 85% and the plant averaged over 90%.

In 1970 the population was 16,200, but only about 13,800 were on sewer; the rest on septic tanks. By 1980 the population was 19,900 and about 17,000 were connected to sewer. This meant that the plant was overloaded. During peak daytime flows, solids were overflowing into the river. The superintendent at the time was falsifying the performance reports to the EPA. (We do not know why – he was lucky he only lost his job and didn't go to prison.) Sometime around 1979 the city was placed on a moratorium for new sewer connections until a new secondary clarifier could be built. That was completed in late 1983 and the

moratorium was lifted. This was the beginning of the modern era of construction phases noted above.



Coeur d'Alene's Advanced Wastewater Plant

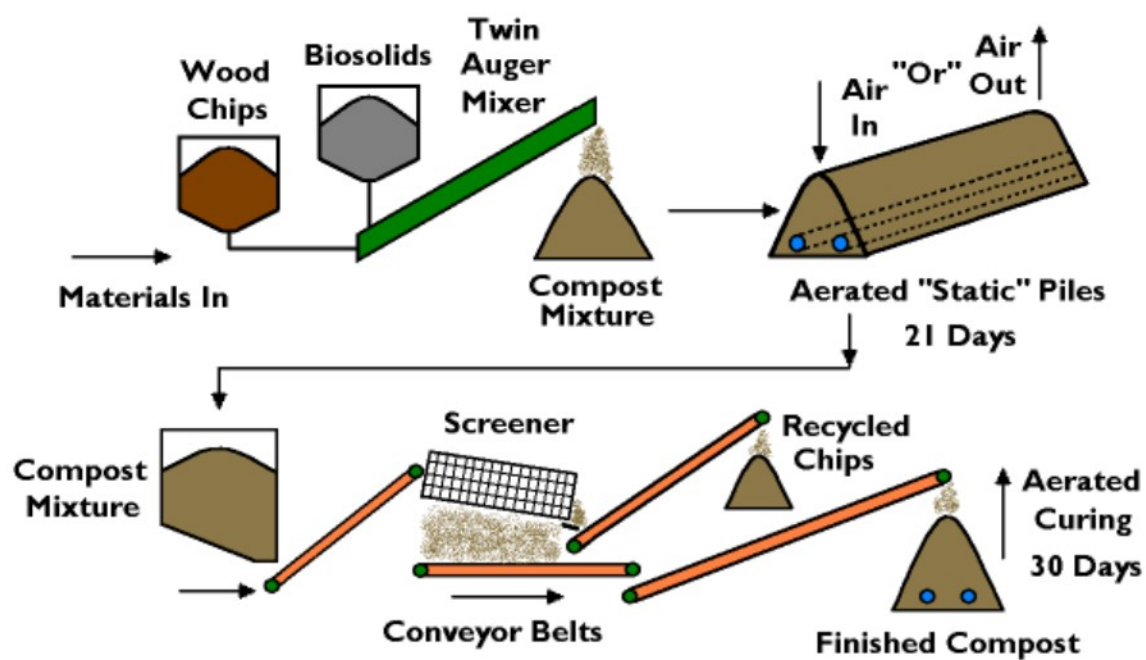


2004 Plant Aerial

1. Headworks & Screening
2. Pre-aeration & Grit Removal
3. Primary Clarifiers
4. Trickling Filter Feed Pumps
5. Trickling Filters
6. Solids Contact
7. Secondary Clarifiers
8. Sludge Re-aeration
9. Chlorine Contact
10. Chlorination/Chemical System
11. Gravity Thickeners
12. Digesters/De-watering
13. Administration/Shop
14. Compost-Bed Biofilters
15. Diffuser Outfall



Plant on May 23, 2011



Coeur d'Alene's Composting Facility